

What is claimed is:

- 1 1. An adjustable spinal implant comprising:
 - 2 an extending shaft having a proximal end and a distal end and having grooves on an
 - 3 external surface of said extending shaft;
 - 4 a fitting attached to said distal end of said extending shaft for engaging a first
 - 5 structure;
 - 6 a substantially cylindrical housing having a proximal end and a distal end and an
 - 7 inner surface and an outer surface, wherein said proximal end of said housing receives
 - 8 therewithin said proximal end of said extending shaft;
 - 9 a substantially cylindrical rotor having an outer surface and an inner surface and
 - 10 having grooves on said inner surface engageable with said grooves on said extending shaft;
 - 11 a locking collar disposed about said outer surface of said housing at said distal end
 - 12 of said housing, wherein said locking collar comprises an outer surface and an inner
 - 13 surface and at least one protrusion directed radially inwardly for engagement with said
 - 14 outer surface of said substantially cylindrical rotor; and
 - 15 a fitting attached to said distal end of said housing for engaging a second structure.
2. The adjustable spinal implant according to claim 1 wherein said grooves on said external surface of said extending shaft are helical.
3. The adjustable spinal implant according to claim 2 wherein said grooves on said inner surface of said rotor are helical and engage said grooves on said external surface of said extending shaft.
4. The adjustable spinal implant according to claim 3 wherein said rotor further comprises circumferential grooves disposed on said outer surface.
5. The adjustable spinal implant according to claim 4 wherein said at least one protrusion on said inner surface of said locking collar engages said circumferential grooves on said rotor.
6. The adjustable spinal implant according to claim 5 wherein said fitting attached to said distal end of said extending shaft is a fixed jaw.

7. The adjustable spinal implant according to claim 6 wherein said fixed jaw is engageable with a first rod.
8. The adjustable spinal implant according to claim 7 wherein fixed jaw further comprises a proximal end and a distal end and an upper surface and a lower surface and a first side surface and a second side surface and a rod opening through said first and second side surfaces that is open at said lower surface, wherein said rod opening comprises a substantially cylindrical opening.
9. The adjustable spinal implant according to claim 8 wherein said fixed jaw further comprises an axial opening near said proximal end and a radial opening through said upper surface extending to said axial opening for receiving a locking device.
10. The adjustable spinal implant according to claim 9 wherein said locking device further comprises a cam having a generally cylindrical shape and a driving end and an engaging end.
11. The adjustable spinal implant according to claim 10 wherein said engaging end of said cam further comprises a first curvate surface corresponding to an unlocked cam position and a second curvate surface corresponding to a locked cam position.
12. The adjustable spinal implant according to claim 11 wherein said cam is rotatable from said unlocked position to said locked position whereupon said rotation alternately moves said first curvate surface away from said rod and moves said second curvate surface into engagement with said rod.
13. The adjustable spinal implant according to claim 12 wherein said fitting attached to said distal end of said housing further comprises an articulating jaw engageable with a second rod.
14. The adjustable spinal implant according to claim 13 wherein articulating jaw further comprises a proximal end and a distal end and an upper surface and a lower surface and a first side surface and a second side surface and a rod opening through said first and

second side surfaces that is open at said lower surface, wherein said rod opening comprises a substantially cylindrical opening.

15. The adjustable spinal implant according to claim 14 wherein said articulating jaw further comprises an axial opening near said proximal end in open communication with said rod opening and a radial opening through said upper surface extending to said axial opening for receiving a locking device.

16. The adjustable spinal implant according to claim 15 wherein said locking device further comprises a cam having a generally cylindrical shape and a driving end and an engaging end.

17. The adjustable spinal implant according to claim 16 wherein said engaging end of said cam further comprises a first curvate surface corresponding to an unlocked cam position and a second curvate surface corresponding to a locked cam position.

18. The adjustable spinal implant according to claim 17 wherein said cam is rotatable from said unlocked position to said locked position whereupon said rotation alternately moves said first curvate surface away from said rod and moves said second curvate surface into engagement with said rod through said axial opening.

19. The adjustable spinal implant according to claim 1 wherein said fitting attached to said distal end of said extending shaft is a fixed jaw.

20. The adjustable spinal implant according to claim 19 wherein said fixed jaw is engageable with a first rod.

21. The adjustable spinal implant according to claim 20 wherein said fixed jaw further comprises a proximal end and a distal end and an upper surface and a lower surface and a first side surface and a second side surface and a rod opening through said first and second side surfaces that is open at said lower surface, wherein said rod opening comprises a substantially cylindrical opening.

22. The adjustable spinal implant according to claim 21 wherein said fixed jaw further comprises an axial opening near said proximal end in open communication with said rod opening and a radial opening through said upper surface extending to said axial opening for receiving a locking device.
23. The adjustable spinal implant according to claim 22 wherein said locking device further comprises a cam having a generally cylindrical shape and a driving end and an engaging end.
24. The adjustable spinal implant according to claim 23 wherein said engaging end of said cam further comprises a first curvate surface corresponding to an unlocked cam position and a second curvate surface corresponding to a locked cam position.
25. The adjustable spinal implant according to claim 24 wherein said cam is rotatable from said unlocked position to said locked position whereupon said rotation alternately moves said first curvate surface away from said rod and moves said second curvate surface into engagement with said rod through said rod opening.
26. The adjustable spinal implant according to claim 20 wherein said fitting attached to said distal end of said housing is an articulating jaw engageable with a second rod.
27. The adjustable spinal implant according to claim 26 wherein said fixed jaw further comprises a proximal end and a distal end and an upper surface and a lower surface and a first side surface and a second side surface and a rod opening through said first and second side surfaces that is open at said lower surface, wherein said rod opening comprises a substantially cylindrical opening.
28. The adjustable spinal implant according to claim 27 wherein said fixed jaw further comprises an axial opening near said proximal end in open communication with said rod opening and a radial opening through said upper surface extending to said axial opening for receiving a locking device.

29. The adjustable spinal implant according to claim 28 wherein said locking device further comprises a cam having a generally cylindrical shape and a driving end and an engaging end.
30. The adjustable spinal implant according to claim 29 wherein said engaging end of said cam further comprises a first curvate surface corresponding to an unlocked cam position and a second curvate surface corresponding to a locked cam position.
31. The adjustable spinal implant according to claim 30 wherein said cam is rotatable from said unlocked position to said locked position whereupon said rotation alternately moves said first curvate surface away from said rod and moves said second curvate surface into engagement with said rod through said rod opening.
32. The adjustable spinal implant according to claim 20 wherein said fitting attached to said distal end of said housing is a fixed jaw engageable with a second rod.
33. The adjustable spinal implant according to claim 32 wherein said fixed jaw further comprises a proximal end and a distal end and an upper surface and a lower surface and a first side surface and a second side surface and a rod opening through said first and second side surfaces that is open at said lower surface, wherein said rod opening comprises a substantially cylindrical opening.
34. The adjustable spinal implant according to claim 33 wherein said fixed jaw further comprises an axial opening near said proximal end in open communication with said rod opening and a radial opening through said upper surface extending to said axial opening for receiving a locking device.
35. The adjustable spinal implant according to claim 34 wherein said locking device further comprises a cam having a generally cylindrical shape and a driving end and an engaging end.
36. The adjustable spinal implant according to claim 35 wherein said engaging end of said cam further comprises a first curvate surface corresponding to an unlocked cam position and a second curvate surface corresponding to a locked cam position.

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37. The adjustable spinal implant according to claim 36 wherein said cam is rotatable from said unlocked position to said locked position whereupon said rotation alternately moves said first curvate surface away from said rod and moves said second curvate surface into engagement with said rod through said rod opening.
38. The adjustable spinal implant according to claim 1 wherein said fitting attached to said distal end of said extending shaft is a first articulating jaw and wherein said fitting attached to said distal end of said housing is a second articulating jaw.
39. The adjustable spinal implant according to claim 38 wherein said first and second articulating jaws further comprise a proximal end and a distal end and an upper surface and a lower surface and a first side surface and a second side surface and a rod opening through said first and second side surfaces that is open at said lower surface, wherein said rod opening comprises a substantially cylindrical opening.
40. The adjustable spinal implant according to claim 39 wherein said first and second articulating jaws further comprise an axial opening near said proximal end in open communication with said rod opening and a radial opening through said upper surface extending to said axial opening for receiving a locking device.
41. The adjustable spinal implant according to claim 40 wherein said locking device further comprises a cam having a generally cylindrical shape and a driving end and an engaging end.
42. The adjustable spinal implant according to claim 41 wherein said engaging end of said cam further comprises a first curvate surface corresponding to an unlocked cam position and a second curvate surface corresponding to a locked cam position.
43. The adjustable spinal implant according to claim 42 wherein said cam is rotatable from said unlocked position to said locked position whereupon said rotation alternately moves said first curvate surface away from said rod and moves said second curvate surface into engagement with said rod through said axial opening.

44. The adjustable spinal implant according to claim 1 wherein said fitting attached to said distal end of said housing further comprises an articulating jaw engageable with a second rod.
45. The adjustable spinal implant according to claim 44 wherein said articulating jaw further comprises a proximal end and a distal end and an upper surface and a lower surface and a first side surface and a second side surface and a rod opening through said first and second side surfaces that is open at said lower surface, wherein said rod opening comprises a substantially cylindrical opening.
46. The adjustable spinal implant according to claim 45 wherein said articulating jaw further comprises an axial opening near said proximal end in open communication with said rod opening and a radial opening through said upper surface extending to said axial opening for receiving a locking device.
47. The adjustable spinal implant according to claim 46 wherein said locking device further comprises a cam having a generally cylindrical shape and a driving end and an engaging end.
48. The adjustable spinal implant according to claim 47 wherein said engaging end of said cam further comprises a first curvate surface corresponding to an unlocked cam position and a second curvate surface corresponding to a locked cam position.
49. The adjustable spinal implant according to claim 48 wherein said cam is rotatable from said unlocked position to said locked position whereupon said rotation alternately moves said first curvate surface away from said rod and moves said second curvate surface into engagement with said rod through said axial opening.
50. The adjustable spinal implant according to claim 3 wherein said outer surface of said rotor further comprises a taper thereon.
51. The adjustable spinal implant according to claim 50 wherein said inner surface of said locking collar further comprises a taper thereon engageable with said taper on said outer surface of said rotor.

1 52. An adjustable spinal implant comprising:

2 an extending shaft having a proximal end and a distal end and having one or more
3 helical grooves disposed on an external surface of said extending shaft;

4 a fixed jaw attached to said distal end of said extending shaft for engaging a rod,
5 said fixed jaw further comprising a proximal end and a distal end and an upper surface and
6 a lower surface and a first side surface and a second side surface; a rod opening through
7 said first and second side surfaces and open at said lower surface; an axial opening near
8 said proximal end and in open communication with said rod opening; and a radial opening
9 through said upper surface extending to said axial opening;

10 a substantially cylindrical housing having a proximal end and a distal end and an
11 inner surface and an outer surface, wherein said proximal end of said housing receives
12 therewithin said proximal end of said extending shaft and wherein said distal end further
13 comprises a socket therewithin;

14 a substantially cylindrical rotor having an outer surface with circumferential
15 grooves thereon and an inner surface with one or more helical grooves thereon wherein
16 said one or more helical grooves are engageable with said one or more helical grooves on
17 said extending shaft;

18 a locking collar disposed about said outer surface of said housing at said distal end
19 of said housing, wherein said locking collar is substantially cylindrical in shape and
20 comprises an outer surface and an inner surface and at least one protrusion directed radially
21 inwardly for engagement with said circumferential grooves of outer surface of said
22 substantially cylindrical rotor; and

23 an articulating jaw attached to said distal end of said housing for engaging a rod,
24 said articulating jaw further comprising a proximal end and a distal end and an upper
25 surface and a lower surface and a first side surface and a second side surface; a rod opening
26 through said first and second side surfaces and open at said lower surface; an axial opening
27 near said proximal end; and a radial opening through said upper surface extending to said
28 axial opening; and a ball depending from said proximal end for engagement in said socket
29 of said housing; and

30 a locking cam disposed within each said radial opening of said fixed jaw and said
31 articulating jaw further comprising a generally cylindrical member having a driving end
32 and an engaging end wherein said engaging end comprises a first concave curvate surface

33 corresponding to an unlocked position and a second concave curvate surface corresponding
34 to a locked position;

35 wherein said extending shaft is moveable within said proximal end of said housing
36 and as said shaft moves, said helical grooves thereon engage said helical grooves of said
37 rotor, causing said rotor to spin and wherein sliding said locking collar from said unlocked
38 position to said locked position moves said one or more protrusions into engagement with
39 said circumferential grooves, thus fixing the length of said implant; and wherein rotating
40 said locking cam from said unlocked position to said locked position brings said second
41 concave curvate surface into contact with said rod, locking said rod to said implant.

1 53. An adjustable spinal implant comprising:

2 an extending shaft having a proximal end and a distal end and having one or more
3 helical grooves disposed on an external surface of said extending shaft;

4 a first articulating jaw attached to said distal end of said extending shaft for
5 engaging a rod, said fixed jaw further comprising a proximal end and a distal end and an
6 upper surface and a lower surface and a first side surface and a second side surface; a rod
7 opening through said first and second side surfaces and open at said lower surface; an axial
8 opening near said proximal end and in open communication with said rod opening; and a
9 radial opening through said upper surface extending to said axial opening;

10 a substantially cylindrical housing having a proximal end and a distal end and an
11 inner surface and an outer surface, wherein said proximal end of said housing receives
12 therewithin said proximal end of said extending shaft and wherein said distal end further
13 comprises a socket therewithin;

14 a substantially cylindrical rotor having an outer surface with circumferential
15 grooves thereon and an inner surface with one or more helical grooves thereon wherein
16 said one or more helical grooves are engageable with said one or more helical grooves on
17 said extending shaft;

18 a locking collar disposed about said outer surface of said housing at said distal end
19 of said housing, wherein said locking collar is substantially cylindrical in shape and
20 comprises an outer surface and an inner surface and at least one protrusion directed radially
21 inwardly for engagement with said circumferential grooves of outer surface of said
22 substantially cylindrical rotor; and

23 a second articulating jaw attached to said distal end of said housing for engaging a
24 rod, said articulating jaw further comprising a proximal end and a distal end and an upper
25 surface and a lower surface and a first side surface and a second side surface; a rod opening
26 through said first and second side surfaces and open at said lower surface; an axial opening
27 near said proximal end; and a radial opening through said upper surface extending to said
28 axial opening; and a ball depending from said proximal end for engagement in said socket
29 of said housing; and

30 a locking cam disposed within each said radial opening of said first and second
31 articulating jaws further comprising a generally cylindrical member having a driving end
32 and an engaging end wherein said engaging end comprises a first concave curvate surface

33 corresponding to an unlocked position and a second concave curvate surface corresponding
34 to a locked position;

35 wherein said extending shaft is moveable within said proximal end of said housing
36 and as said shaft moves therewithin, said helical grooves thereon engage said helical
37 grooves of said rotor, causing said rotor to spin and wherein sliding said locking collar
38 from said unlocked position to said locked position moves said one or more protrusions
39 into engagement with said circumferential grooves, thus fixing the length of said implant;
40 and wherein rotating said locking cam from said unlocked position to said locked position
41 brings said second concave curvate surface into contact with said rod, locking said rod to
42 said implant.

1 54. An adjustable spinal implant comprising:
2 a substantially cylindrical housing having a proximal end and a distal end and
3 having an axial opening therein;
4 an extending shaft having a proximal end and a distal end wherein said proximal
5 end is insertable into said axial opening;
6 a rotor rotatably disposed within said axial opening and having an external surface
7 and an internal surface wherein said internal surface engagingly cooperates with said
8 extending shaft;
9 a locking collar disposed on said substantially cylindrical housing slideable
10 between an unlocked position wherein said locking collar does not engage said rotor and a
11 locked position wherein said locking collar engages said rotor;
12 a first fitting attached to said distal end of said extending shaft; and
13 a second fitting attached to said distal end of said substantially cylindrical housing.